

The Change We Must Make: Opportunities for Photovoltaics and Fuel Cells

by *S. R. Narayan*



The members of ECS, and the Energy Technology Division in particular, find themselves with this unprecedented opportunity to be the unquestionable agents of change by rapidly developing technology solutions for producing clean energy for mankind. The growing economies of the world are hungry for lots of energy, along with other necessities such as food and water. The challenge of meeting the world's gargantuan energy demands in a sustainable manner with low environmental impact is undoubtedly one of the most important challenges of this century. The ECS Energy Technology Division represents the membership that engrosses itself with the science and technology of sustainable energy generation and conversion strategies for solar, electrochemical, and thermoelectric systems.

The ancient civilizations have always revered the sun and water for the sustenance of life. And the vicissitudes of the last couple of decades have led us to firmly believe that a sustainable energy future must include harnessing the abundant resource of radiant energy from the sun. Yet, why isn't photovoltaic energy generation a familiar part of our daily lives? The promise of clean and efficient energy systems for transportation has propelled the development of hydrogen fuel cell vehicles by almost every one of the world's major automakers. Yet, what holds back the fuel cell vehicle from escaping the confines of the showcase into the marketplace?

The spectacular leaps made in the technology of rechargeable lithium ion batteries are being continuously marginalized by the unrelenting demand for high-energy compact power sources. Can fuel cells sustain, in a trouble-free manner, the limitless hunger for energy by portable electronics? What materials solutions must we seek to address these challenges? Do we have the means to probe relevant materials properties at the atomic scale so that we may increase our understanding of the underlying issues?

These questions are addressed by the four feature articles that have been lined up for this issue featuring the Energy Technology Division where experts drawn from this Division provide their perspectives. We hope that these articles will serve as the basis for a broader discussion and in-depth enquiry. ■

About the Guest Editor

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